

Hobbies

WEEKLY

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Patterns for a model of Stephenson's EARLY TYPE LOCO

FROM about the year 1814 the progress of rail transport made revolutionary strides. We have all heard of the 'Puffing Billy' which was built about 1814; well, since then many new types of locomotives have been built which have extended our commerce and trade.

It is interesting to note the varying forms these locomotives took, and the model maker, who is interested in railways, would be well advised to make up a set of these early models as comparisons with the modern huge engines seen in our own railways.

Distinctive Type

We have chosen for our model this week one of George Stephenson's earlier type of loco's which he built about 1844. Our model, shown in the picture on this page, is of the high fire-box with long boiler type, and it makes a really interesting little piece to make up in wood.

This model, we might say, is designed for the amateur model maker who, perhaps, has not so far attempted such a piece of work. No special tools are required beyond the fret-saw, shaping knife, glasspaper and a tube of glue. Some stout brass wire will also be

required for the handrails, etc., and some card for the formation of the long boiler.

Let us then commence to make the model by setting out the main floor or footplate.

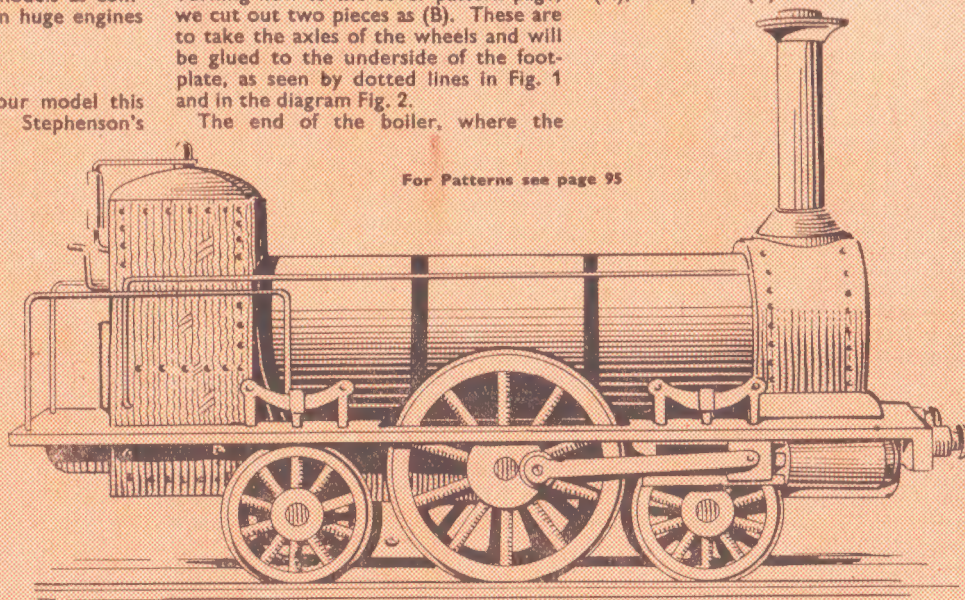
A piece of $\frac{1}{4}$ in. thick wood will be wanted for the footplate, measuring 10 $\frac{1}{2}$ ins. by 4 $\frac{1}{2}$ ins., and as Fig. 1 shows, there are three interior openings to be cut in it to the measurements given. The position of other pieces to be glued to this floor is shown by the dotted lines. Turning now to the cover pattern page, we cut out two pieces as (B). These are to take the axles of the wheels and will be glued to the underside of the footplate, as seen by dotted lines in Fig. 1 and in the diagram Fig. 2.

The end of the boiler, where the

funnel is, will be made up of four pieces, as (C) on the pattern sheet, three being cut from $\frac{1}{4}$ in. wood, and one from $\frac{1}{8}$ in. wood. They will be glued together and cleaned round with glasspaper. The overlay (D) will be cut according to the dotted line on (C), pattern sheet, and this will be of $\frac{1}{4}$ in. stuff. See Fig. 2 for completion of this part. Cut two of piece (E) from $\frac{1}{4}$ in. wood and glue to pieces (C).

Now turn to the firebox (Fig. 3) which is made up of pieces (F), (G) and (H), with piece (K) for the base. Wood

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$\frac{3}{8}$ in. thick will be used for all these pieces. The top (H) will consist of two pieces $2\frac{1}{2}$ ins. by $1\frac{1}{2}$ ins. glued together and afterwards shaped up with rasp, file and glasspaper to the outline shown in the side view Fig. 4, and the detail Fig. 3. Take care in assembling and gluing up the pieces to see that they are butted together properly and in the order shown, such as pieces (G) go in between the sides (F) of the firebox.

The overlay (I) is 1 in. square, and of

A buffer plate is next made from $\frac{3}{8}$ in. wood, size $4\frac{1}{2}$ ins. by $\frac{1}{2}$ in., see Fig. 2 for its position. To this plate are glued the washers (P), (Y), (Z) to form the buffers, piece (Z) being rounded to form the shaped face. Some careful fretcutting and handling will be needed in our next item—the wheels.

Two of the larger pattern wheel, and four of the smaller will be needed. Cut one of each from the $\frac{3}{8}$ in. wood, and then, either make a tracing or a rubbing

each cylinder, as shown in Fig. 4 and on pattern sheet. The piston which works freely in the hole of the cylinder is shown as (V) on the sheet, and the square portion of it must slide easily in the slide piece (T) which is glued centrally with the cylinder to the footplate. Two of each piece will, of course, be made, one each side of the loco.

Two cover pieces as (W) are glued on, one each side of (V), as seen in Fig. 6 to hold the piston in place when it travels backwards and forwards through the cylinders.

Two connecting rods as (U) on the

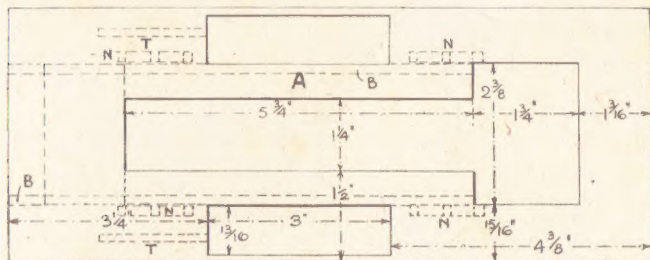


Fig. 1—The lay-out of the baseplate

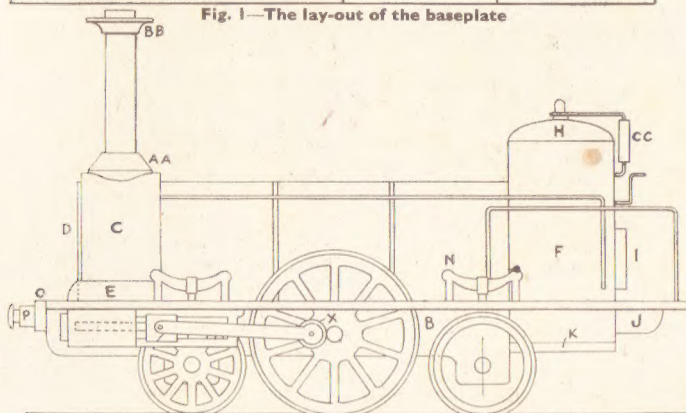


Fig. 4—Side elevation showing position of parts

$\frac{1}{8}$ in. or $\frac{1}{4}$ in. wood. The two brackets (J) are cut to the outline given on the pattern sheet and glued as shown underneath the footplate, see Figs. 3 and 4.

For the boiler we need three discs as (L) on the pattern page. Cut these out carefully and note the two notches in each disc which are to fit into corresponding recesses in piece (M), two of which are required as outlined on the pattern sheet. In Fig. 5 is shown the method of gluing up the pieces to form the framework, as it were, of the boiler. Only the middle disc is shown here, the end ones will be similarly treated.

To cover this framework and so form the circular boiler, we have a square of stoutish card $5\frac{1}{2}$ ins. long by about 7 ins. wide. Apply glue all round the edges of the three discs and then bend the card on to them, holding the latter tightly in place by slipping over two or three elastic bands until the glue has hardened. The completed boiler should now fit accurately and be glued between the two end uprights of the footplate and go into the opening of the latter for a distance of $\frac{3}{8}$ in. Four springs, as (N) on the pattern sheet, should next be cut from $\frac{3}{8}$ in. wood and glued to the footplate in the positions given on the plan Fig. 1, and side view Fig. 4.

of this for cutting the remainder, or use the cut-out wheels for drawing round in pencil direct on to the wood.

To form the flanges of the wheels cut rings of stoutish card or $\frac{1}{8}$ in. wood to the outer dotted lines shown on the patterns of the wheels, the width of the rings being $\frac{1}{4}$ in. to fit the inner curves of the fretted parts between the spokes. Glue the flanges cleanly to the wheels and see there is an equal margin all round the rim. Next cut off three pieces of $\frac{1}{4}$ in. diameter rod as (S) on the pattern sheet, and run them through the holes of bearers (B) where they should fit loosely enough to allow free turning. Put the larger wheels up through the slots in the footplate and so attach them to the axle.

The smaller wheels are easily fitted and fixed to their axles and all must run smoothly and clear of the sides of footplate, etc. Clean off the outer surfaces of the hubs of the wheels including the axle ends, before taking the next step in operations, which are the outside cylinders and connecting rods, etc.

A glance at Fig. 4 gives the general arrangement of the fittings.

A 'flat' must be made as shown so the cylinders when glued sit well up underneath the footplate. A cover disc, as (R) on the sheet, is glued over one end of

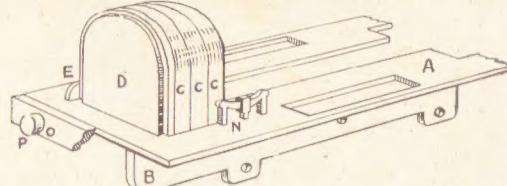


Fig. 2—Front end of footplate

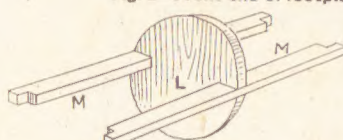


Fig. 5—Boiler framework

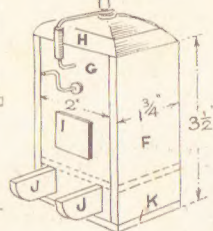


Fig. 3—Firebox

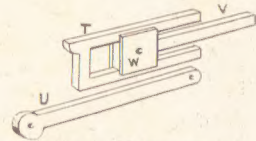


Fig. 6—Valve gear

the ends of the piston rod. Pieces (T) are $\frac{1}{8}$ in. thick, also piece (V), the former pieces must be glass-papered down a little so as to allow pieces (V) to project slightly to take the side squares (W). Two bosses or discs (X) must be cut from $\frac{3}{8}$ in. wood.

The funnel is a 2 in. length of $\frac{1}{4}$ in. rod. The boiler end is from a $\frac{1}{8}$ in. thick disc cut and shaped up as (AA).

The capping is shown at (BB) on the sheet and is simply a disc of $\frac{1}{8}$ in. wood shaped as shown. All are glued and pinned together and glued to the boiler. The steam gauge, etc., and the various railings along the sides of the boiler and the handrails are all made from stout brass wire let into the wood to make neat fixings.

In painting the model a good oil paint or enamel should be used. The boiler should be sap green and the front funnel portion and the firebox black. The springs and the wheels should be a dark red lined in yellow. Wheel spokes should be shaped if possible to give a realistic effect.

The model should be mounted on a stout base and painted or french polished. The wheels should stand on strips $\frac{1}{4}$ in. square to represent railway lines, and sleepers could be added of $\frac{1}{8}$ in. by $\frac{1}{4}$ in. stuff. All should be painted black. Narrow brass bands might be cut from strip brass and pinned round the boiler, or these bands may be represented by painting them on in yellow paint. (277)

Lamp and book holder combined in this simple BEDSIDE COMPANION

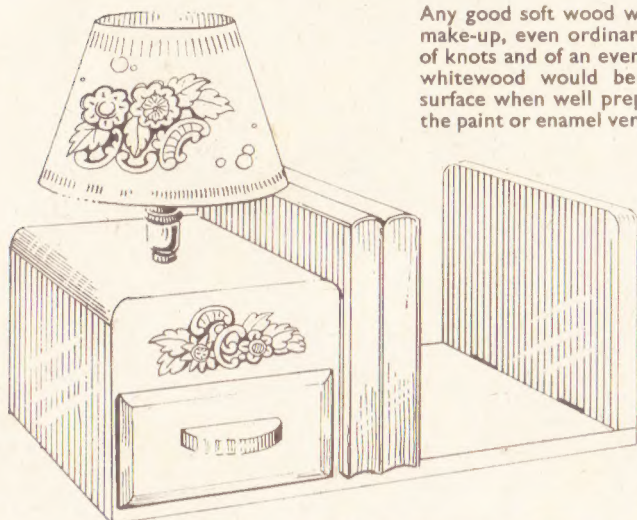


Fig. 1—The completed stand with decorated shade on cabinet

HERE is a simple yet very effective electric lamp stand in the form of a book rest. There is also a useful little drawer in which might be kept the assortment of small articles which may always be found in the bedroom. There is room for a few small books, Penguins or Pelican volumes being most suitable and handy for the bedside. Such an article as this would make a truly useful and acceptable gift for birthday or Christmas.

Wood $\frac{1}{2}$ in. thick is used for the base, the top of the box, and the end upright. Wood $\frac{1}{4}$ in. thick is suggested for all other parts.

A good idea of the finished article may be got from Fig. 1, and shows how the decoration is obtained with wood stains or paints. It would make for a good colour scheme and a very attractive combination if the electric lamp shade were decorated in somewhat the same manner as the motif on the box above the drawer front. Various coloured stains can be purchased that will take to the parchment or other material which might be used for the shade.

The general construction of the box, etc., can be seen in the sectional diagram Fig. 2. The base (A) consists of a panel measuring 9 ins. by $4\frac{1}{2}$ ins. by $\frac{1}{2}$ in. thick.

Any good soft wood will answer for the make-up, even ordinary deal if it is free of knots and of an even grain. American whitewood would be better, and the surface when well prepared, would take the paint or enamel very well.

Upon the base the box construction can be put, and from the cutting list, at the end of this article, those parts lettered in Fig. 2, which go to make the box can be set out and cut and cleaned up. The two sides (B) are accurately cut and glued and screwed to the base. Then the cross piece (C), shown cut

through in Fig. 2, is glued in.

A careful fit must here be made and the jointing kept as fine as possible, this latter, however, will eventually be filled with the paint after a level surface has been made with glasspaper.

The top (D) is of $\frac{1}{2}$ in. wood, the two edges shown being nicely rounded after fixing with the glue. Small gluing blocks can be put along inside in the angles between top and sides to strengthen the fixing. The hole in the centre of piece (D) must be made large enough to take the brass ferrule or sleeve of the lamp holder.

The flex to be connected up to the lamp socket passes through this and out at the back of the box, a hole being made near the top of the back (E) for the passage of the flex. Piece (E) is let in between the sides, the base and the top (D).

Two drawer guides should next be added so that when the little drawer is pushed into place it will run in level and will not tilt forward when fully drawn out. The guides, consisting, perhaps, of $\frac{1}{4}$ in. square wood are glued to the inner faces of the sides (B) and in line with the lower edge of piece (C), that is im-

mediately above the top edges of the sides of the drawer, as (J) in Fig. 3.

The construction of the drawer is made clear in Fig. 3 and needs but little comment beyond these illustrations. When the actual box part of the drawer, consisting of parts (I), (J), and (K), are glued up and pinned with fret pins neatly along the sides and edges, the outer front (L) is glued on. This front, as will be noted from the cutting list, is a little larger all round than the actual opening in the front of the box, so that when the drawer is pushed home this front rests neatly and flush with the front surface of the box. The section through the front of the drawer, shown in the circled diagram in Fig. 3, shows the relative position of all the parts when the drawer is slightly withdrawn.

Hinged End

The end upright (F) of the bookrack is shown hinged to the base, so it can be folded down for packing if necessary. Cut the piece from $\frac{1}{2}$ in. wood and round off the two top corners, as seen in Fig. 2. A pair of stout brass hinges should be recessed into the lower edge of the upright and screwed there.

Then the upright is folded down flat against the base and the flap of the hinge then screwed to the base. A fillet (G) of hard wood for preference should finally be screwed to the base, as shown in Fig. 2, the upper edge being rounded and all sharp corners taken off.

The Bookstand is not intended for heavy or cumbersome books. There are at least two ways of finishing off the woodwork of this stand. One is a cream or green matt enamel laid on a covering coat of ordinary paint. The first coat of paint must be allowed to thoroughly harden before the final coat of enamel is laid on.

A simple cone shape shade can be made from parchment to go in a ready-made wire frame. Or the worker may prefer to purchase a shade complete and add the decorative work as previously suggested. The electric flex for the lamp is brought up from the house plug and carried up direct to the bookstand, carrying it through the back direct to the lamp fitting.

CUTTING LIST	
A	9 ins. by $4\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
B	4 ins. by $3\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
C	3 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
D	4 ins. by $4\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
E	3 ins. by $3\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
F	4 ins. by $4\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
G	3 ins. by 1 in. by $\frac{1}{2}$ in.
H	Hinge—one pair, $\frac{1}{2}$ in.
I	4 ins. by $3\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
J	4 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
K	3 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
L	3 ins. by $2\frac{1}{2}$ ins. by $\frac{1}{2}$ in.
M	$1\frac{1}{2}$ ins. by $\frac{1}{2}$ in. by $\frac{1}{2}$ in.

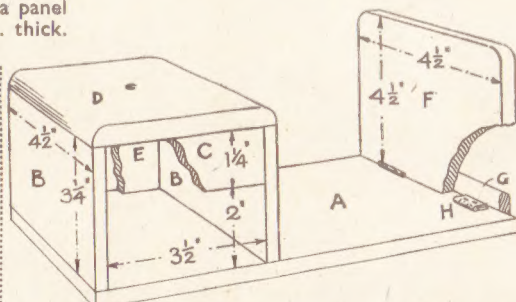


Fig. 2—Constructional details of cabinet and hinged book end

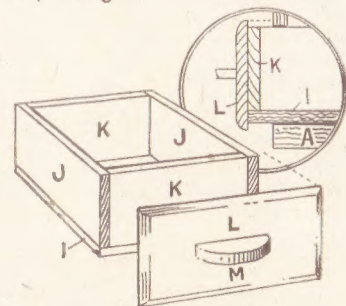


Fig. 3—How the drawer is made

You need not be a trained artist to enjoy FUN WITH A PENCIL

EVEN though one's knowledge of drawing is limited, good fun can be had with a few strokes of a pencil and a lot of thought. Forget the rules, the details and the anatomy for a while and aim at simplicity.

If a head is round draw a circle. Try and draw the circle freehand. If you cannot, use a compass—who cares? Think of eyes. There are pig-eyes, slit eyes and round eyes, among others. Put the

have become faces, diagrammatic perhaps, but faces which are full of life.

Apply the same principles to the profile. Use the circle for the head, the nose projecting beyond the circumference, and make use of hair as a solid black shape. Watch other people or yourself in the mirror, and note the 'lines' of the various expressions.

Triangle Shapes

Now, a well-built man is broad in the

basic figures the trimmings are added, the collars and ties, and odd lines to suggest coats, blouses and skirts.

We read of the strong young man, straight and upright. Straight and upright gives us a clue to the basic line, a straight perpendicular line. As age creeps on the straight line begins to bend and the torso tends to fat. In the profile, the perpendicular curves, and the front bulges out. For the female profile, an oval placed on top of a slightly

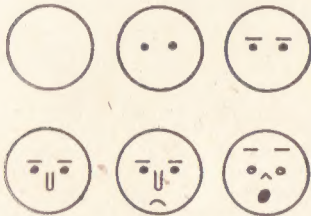


Fig. 1—Circles form a basis for expressions



Fig. 2—Three simple profiles

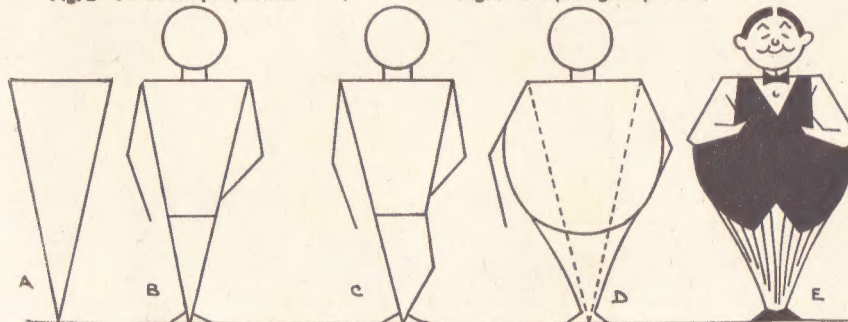


Fig. 3—The triangle at A with stages in outline and completed

eyes in the circle. What of noses? Long ones, short ones, turned up ones. Choose the type you want and suggest it by a simple line.

Facial Expressions

Eyebrows may be straight or round, and you raise your eyebrows in surprise. Note how the position of the eyebrows alters the expression. The line of the mouth with the ends turned down gives a miserable expression. Turn the ends up and pleasure results. An oval will indicate a mouth which is open.

With such lines placed in varying positions, an amazing number of expressions are obtained, and the plain circles

shoulders, and roughly speaking, tapers to the feet. So draw a long triangle, with the shortest side on top, and the point opposite immediately beneath, as though it were sticking in the floor. On the top line erect your neck and circular head. Add two arms and two feet. If the man is fat, you can hang the torso in a beautiful curve from shoulder to shoulder.

The Woman

The female is known by her curves. Start with one circle on top of a slightly larger one. For the legs place two lines from the lower circle to a point on the floor. Add arms and head. To these two

larger oval will suffice for the torso. Add limbs and head.

Now for action. This is determined by the poise of the head, the slope of the body and the position of the limbs. Watch for it in the people passing by. Take the strong, young man again. When walking, his shoulders are thrust back; he is springy on his feet; his arms are swinging.

When he runs, his body is forward and his stride is long. When the old man walks his steps are short, his feet tend more to shuffling. When a lady runs normally her body is more upright than the man's, her steps are shorter.

Observation and thought give us the basic lines. On these lines we hang the bodies. After single figures have been tried out, group two or three together. Some amusing incidents can be produced.

(296)



Fig. 4—The basic lines of a woman

Fig. 6—Profiles showing actions



Fig. 5—Simple figure profiles

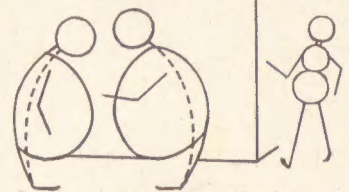


Fig. 7—The lines to make the picture below



Fig. 8—A picture from No. 7 lines

How to make and use an outfit for undertaking SILK SCREEN PRINTING

SCREEN printing provides the home handyman with a simple and effective means of reproducing designs in various colours on such articles as table mats, fire screens, trays and, in fact, on anything which has a flat smooth surface. It also enables him to make his own birthday and Christmas cards, calendars and even invitation cards. As well as to print his own notepaper or simple bills and posters for such things as social functions, meetings, concerts, etc.

The purpose of this article is to describe the simple and, fortunately, inexpensive equipment which is required for this. A second article will deal with the materials to use, the way to make the necessary stencils, and the actual printing of the job.

No attempt will be made to burden the amateur enthusiast with too much technical information of an advanced nature, but we shall try to show how he may obtain both fun and satisfaction by doing simple screen printing well.

How it Works

Screen printing is a stencil process and the equipment consists of a flat baseboard, which can be fixed to a bench in the garden shed or to the kitchen table, if no one objects, and a frame. One side of this frame is hinged to the baseboard so that it lifts up and down like a book. A small piece of wood is attached to the side of the frame so that it swings loosely and holds it up when required (see Fig. 1).

Across this frame you will have to stretch either taffeta or bolting silk, the function of which is to support the stencil. This stencil is to mask out those parts of the design where you do not wish to print.

Before asking you to make the few simple items of equipment, it is best to tell you how the process works, so that you may know why each is necessary.

As already stated, the screen supports the stencil and so holds such 'floating' pieces of it as the middle of such letters as the 'O' or the 'B', etc. If it were not for the screen, such

stencil pieces would be quite unattached for there are no 'ties' left in the stencils used for good quality silk screen printing. The stencil pieces are fixed to the screen with adhesive.

The job to be printed is placed on the base-board so that two of its edges are set against 'register guides' (described hereafter) attached to this base-board.

This most modern form of printing can be undertaken by the amateur. An expert here tells you how to make the apparatus to use for colour printing at home.

Then you lower the screen and pour a little colour on to a space at the end called the 'fountain head' and by drawing a squeegee (described hereafter) across the screen, you force colour through the mesh of those parts of the screen unprotected by the stencil on to the job beneath. Next you place the squeegee in its housing (see Fig. 2) and lifting the frame, remove the printed job and put it in a rack to dry (see Fig. 3). Then insert

another copy in position and repeat the printing operation.

Making the Frame

The frame consists of four wooden sides joined at right angles. A convenient size for home use would be about 15ins. by 20ins. This would be suitable for most amateurs, unless they want to print double crown posters, which being 20ins. by 30ins. would require a frame about 24ins. by 40ins. The frame should be hinged to the base-board, after the silk or taffeta has been stretched across it and tacked firmly. The construction of the frame is shown in Fig. 4.

Good quality screen taffeta or organdie will usually serve the needs of the amateur, but if you decide to use bolting silk, this may be obtained from any firm supplying equipment for screen printers. Whatever material is used, it must be stretched across the frame very tightly indeed, or satisfactory printing results will not be obtained. Indeed the screen must be as taut as a drum and if you do use bolting, number 12 double XX will be satisfactory for most 'home' silk screen printing.

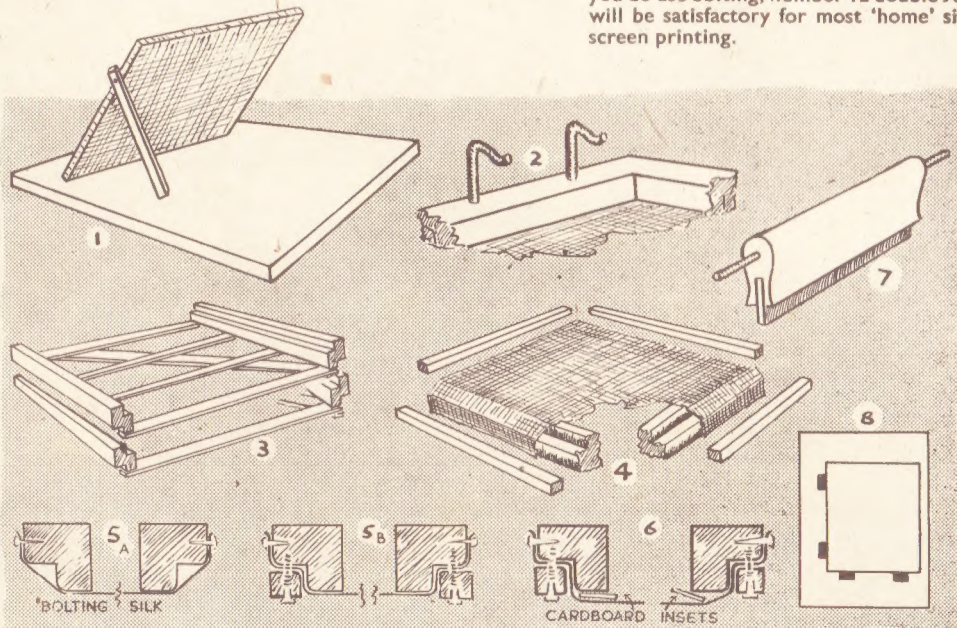


Fig. 1. The base board and frame with screen stretched across it. The wooden strut swings freely and allows the screen either to be closed or keeps it raised in the position shown.

Fig. 2. The housing for the squeegee.

Fig. 3. Drying racks made to pile on each other. Sufficient space should be left between the units to allow the wet printed job to remain between each without it touching the rack above.

Fig. 4. The frame with the screen stretched across it. The extra pieces of wood will be pressed into the rebates to tighten the screen even further.

Fig. 5a. Detail showing first stage in tacking the screen to the frame.

Fig. 5b. The second stage—the pieces of wood are being pressed home into the rebate and secured with wood screws.

Fig. 6. Strips of cardboard may be forced between the screen and the frame if this is necessary to make it really taut.

Fig. 7. A handy kind of squeegee—the blade is rubber and the pins protruding from either end are to allow it to hang conveniently on its housing.

Fig. 8. Plan view of the baseboard. The job to be printed is shown in position against the four register guides. These can be cut from thin pieces of card or thick paper if the job to be printed is thin. Stick or nail the register guides required to the baseboard.

To stretch the screen over the frame, cut the cloth about 5ins. or 6ins. larger than the outside measurement, and tack down, at intervals of about 1in., along one of the long sides of this frame. The tacks should be on the outside edge and the cloth turned over the frame to allow for this. The accompanying illustrations will make the point clear. The tacking should start from one corner and the cloth must be kept pulled as tightly as possible while this is being done.

When the first side is completed, one of the sides at right angles to it, should be tacked, great care being used to keep the cloth taut while it is being done. With two sides tacked, the cloth must again be stretched while the remaining two sides are secured with more tacks.

It will be seen from the illustration at Fig. 4 that the frame has a rebate in it, so that the cloth folds over it in such a way that, instead of making one bend at right angles to enable it to cover the outside, it makes two bends, each at 45 degrees. It thus spans the rebate diagonally, thereby leaving a triangular empty space between itself and the surfaces of the rebate. This is to enable the screen to be tightened still more after the material has been tacked.

The additional strips of wood shown

in the illustration, should now be screwed down into place so that they fill the rebate. Thus they will tighten the screen further by pressing the cloth down into the rebate of the frame.

The screen should now be very taut indeed, but if further tightening is required, strips of cardboard may be inserted between the underside of the frame and the cloth, in the manner shown in Fig. 6.

If the stock on which you wish to print is paper or very thin card, the frame should be hinged to the base-board direct. But if you intend to print on anything thicker, such as plywood or glass, the hinge should go on to a 'distance piece' a little thicker than the job to be printed, so that the screen may rest flat on the job when it is lowered for printing, without straining the hinges.

The Squeegee

The squeegee consists of a strip of rubber set in a wooden handle. It should not be quite as wide as the width of the inside of the screen and a handy shape is shown in Fig. 7. The blade of the squeegee should be kept sharp by rubbing on a sheet of glasspaper. The purpose behind keeping the blade sharp

and the edge true is to ensure satisfactory prints.

Register guides are necessary to ensure that the sheets to be printed are always kept on the base-board 'in register', i.e., in a uniform position in relation to the screen. They must be left in position until all the colours on a particular job are printed. Otherwise the various colours would not be in register with each other. Two edges of rectangular sheets should be registered to guides as illustrated in Fig. 8.

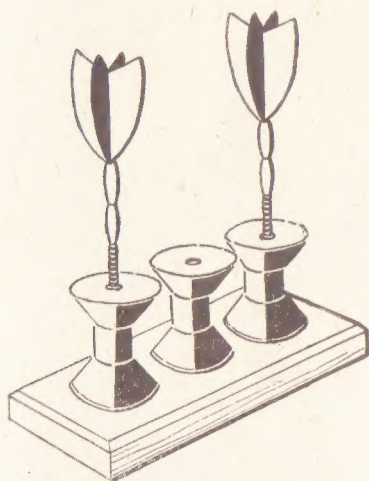
Drying Racks

The amateur doing only a small quantity at a time will not require to make special provision for the drying of his work, for the various jobs will not take up too much room if they are spread out and allowed to dry overnight. However, in case he should wish to provide himself with a drying rack, included in Fig. 3 is an illustration which shows a handy kind of rack.

So much for the necessary equipment. All of it can be made at home with very little trouble and expense. In the next article we shall show how to prepare your stencils, choose your materials and colours, and print the job. (270)

(To be Continued)

Some wood and three empty bobbins will make A SIMPLE DART HOLDER



HOW often damage is done to the flights of darts, especially the feathered ones, when they are hurriedly placed on any convenient shelf or mantelpiece after the game is over. The easy-to-make, cheap little model shown can protect your dart-flights from damage, and at the same time sheath the steel points. This Dart Rest always looks handy on any shelf.

The model is made from the following materials. A piece of oak 6ins. long and 2½ins. wide, and ½in. thick; three discarded cotton bobbins 2ins. tall and

1½ins. across the widest diameter; six flat-head wood screws 1in. long, No. 4; S.W.G.; and if possible an old piece of green baize to be glued to the bottom of the base with Durofix adhesive.

This baize makes a smooth contact surface for the model to stand anywhere, and never leaves scratches. Cut the oak base to true rectangular shape, and then draw a pencil line lengthways down the centre of the top surface. Mark out the position of the screw clearance holes on this line, as shown in the front view of the diagram. Place a ½in. twist-drill in your hand-drill and make the clearance holes for the screws. Countersink these so the heads of the screws are well below the surface of the wood.

If you have not a vice, you can easily do this drilling by securing the base between two strong battens nailed on a solid block of scrap wood.

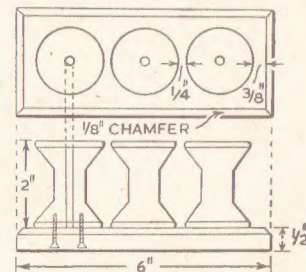
Now with your plane tilted slightly upwards, and working with the grain, make the ½in. chamfer along the surface perimeter of the base. With a small pair of calipers, or even dividers you can find the diameter of the base of the bobbin. Then draw in this diameter with your pencil, and also mark the two points on the bevel of the bobbin, where the diameter cuts the circumference.

Arrange the bobbin on the base so these pencil points on the bevel are aligned with the central line of the upper surface of the base. Now you can screw in the 1in. wood screws to fix the first

bobbin in position. When the other two bobbins are also screwed in position use a fine glasspaper on all the surfaces of the model, but not on the bottom one of the base.

This must be roughened with a marking knife, or a strong clasp knife, ready to receive a layer of Durofix adhesive. Smear some on the green baize, too. Bring the two surfaces together, and balance some heavy books, or an iron on the top of the bobbins to apply some pressure. The best method to do this is to fix the model between two strips of planed wood, arrange in the vice, and leave for the day.

Then remove the model and trim the projecting edges of the green baize, with



Plan and section of article

a pair of very sharp scissors, to the perimeter of the oak base. To add a pleasing final appearance to your model give it two coats of green enamel paint. (258)

An expert tells you exactly how to make a VENTRILOQUIST'S DOLL

WITH the growing popularity of Ventriloquism as a form of intimate entertainment, there has arisen an ever-increasing number of exponents of the art.

Successful broadcasts by radio and television, to say nothing of brilliant ventriloquial acts on the variety stage, the concert platform, and on the films, have awakened the desires of a number of people of both sexes to amuse their friends and, perhaps, turn an honest penny out of a deceitful voice, by emulating the example of that fabulous prince of vocal tricksters, Valentine Vox.

A great deal of the ventriloquist's success, however, depends not only on his vocal accomplishments, but also on the puppet he uses as his mouthpiece—his dummy. In fact many world-famous ventriloquists have, in a way, had to take second place in popularity to their very wonderful dolls.

Personality Appeal

For instance, 'Jim' the mouthpiece of the late Arthur Prince; 'Charlie McCarthy'; and 'Mortimer Snerd', Edgar Bergen's puppets; and our own famous 'Archie Andrews', are outstanding examples of the doll itself becoming an actual public character and obtaining personal popularity. Hence the incentive to would-be-deceivers to take up the art.

A really good ventriloquist's doll is a costly puppet. It has to be something more than a mere doll. Apart from the fact that it must be well made, it must

cost much money should not deter any aspirant for ventriloquial fame from obtaining a figure; and the cheapest way to do this successfully is to make the puppet for yourself. So it is the object of this short series of articles to explain the general principles of form and construction; the actual design and finish of the figure will be left to the skill and ingenuity of its maker.

Head and Face Character

The shape of the head and the character of the face being the most important part of the puppet, serious study should be given to these points before any attempt is made on the actual modelling. The anatomy of the head should be studied, the bone formation of the skull, and the more important muscles. This may seem to be going rather deeply into the subject but actually it is the basis of all good work on the head, whether by modelling or carving.

With a good working knowledge of the shape and proportions of the head and face, the craftsman can rest secure that his work will be a success. As far as comparative proportions are concerned, it is worth noting that the face is divided horizontally into three equal sections. (1) hair-line to eyes; (2) eyes to tip of nose; and (3) nose to chin.

The space between the eyes is about the width of one eye, and the width of the mouth should be the same as the space between the eye-balls. The width across the cheekbones should be noted, the angle of the jaw and the shape of the chin.

The all-over size of the head should be about the same as that of a young child. The figure may have to be seen by a large audience, and if the head is too small the whole puppet will look insignificant and completely fail in its purpose.

The head is made in stout papier mâché, about $\frac{3}{4}$ in. in thickness. This may be done in two different ways. In the first system a pattern head is modelled in clay or plasticine. This model is then cut, vertically, in half. Each half is laid, flat-side downward, on a sheet of glass; about 1 in. away all round the model, a 'wall' of clay is built up, and into this space, covering well the whole of the half-head, plaster of paris is poured and allowed to set hard.

Both halves of the head are treated in this way. The clay is then removed, thus leaving two halves of a mould from which impressions can be taken. Before the papier mâché is forced into the moulds the inner surface of each of the plaster sections is painted with shellac to smooth and harden the pattern.



Papier mâché on the Plasticine head shape

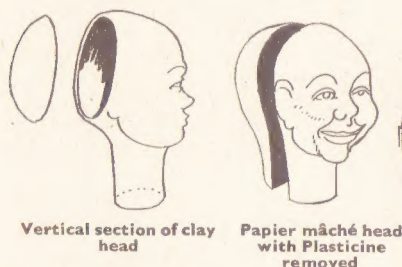
Making Papier Mâché

The papier mâché itself is made of layers of strips of newspaper dipped in flour paste until the required thickness is obtained. It is allowed to dry well before being removed from the moulds and when completely dry and hard, the two halves of the head can be joined together. As a rule, however, the eye and mouth fittings are set in position before the sections are finally joined.

In the second method the head is modelled first in Plasticine. This time the paper layers are placed on outside the pattern. They are pasted on each layer consisting of small pieces of torn paper until the whole head is completely covered. As each layer becomes dry, another covering is put on, usually of a different coloured paper to make sure of a perfect covering. This process is repeated until at least a dozen layers are well pasted and smoothed on. Then the whole thing is allowed to dry.

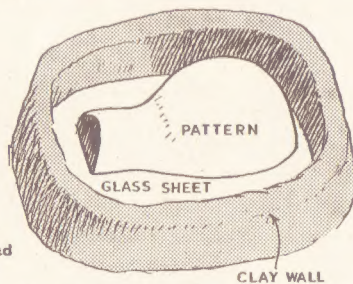
The Back Opening

When it is ready for the next stage, the back of the head is cut away very carefully, the Plasticine removed, and after the movable fittings have been securely placed into position, the backpiece is replaced and fixed, and the head is ready for its make-up and wig. It is a good plan to add a complete layer covering of thin linen, usually about half-way, in the process, this makes the head doubly strong against knocks or pressure.



Vertical section of clay head

Papier mâché head with Plasticine removed



How to make a plaster of paris mould

also have character and a good personal appearance, which all means individual work and accurate finish.

Unfortunately in many cases this is far from being the fact. Some really excellent showmen, masters of their voice and art, appear before their audiences with dolls with most inhuman looking heads, faces such as no human being ever had, and mouths which not only open like traps, but look like traps opening, too.

The most important part of the puppet, whereon the eyes of the whole audience are continuously centred, should be a work of art and express a real personality.

The mere fact that first-class puppets

Assuming then that these preliminary studies have been made and all the important points of structure and proportions duly noted, the craftsman can proceed, at last, to the actual construction of a head.

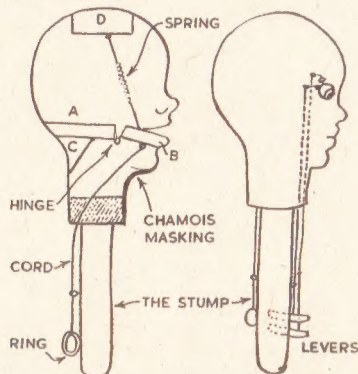
The First Decision

The first thing to decide on is the character of the puppet. What shall it be? There are quite a number of very popular types used by ventriloquists; there is the 'Cheeky Boy', the 'Page Boy', a Sailor, a Soldier, a Costermonger, a Nigger, an Old Man, and so on to suit almost every range of ventriloquial voice.

The average ventriloquist's doll is fitted with three special movements to the head. The mouth for speaking; the eyes; and the neck—nodding and turning. Additions and variations to these movements occur; eyebrows are made to raise; eyes to close. Some puppets are made to smoke, and even to spit—a particularly unpleasant accomplishment and one which any good showman will do well to avoid.

Mouth Mechanism

Most important of all the movements made by the ventriloquist's doll are those of the mouth—the act of speaking. On the opening and closing of the puppet's mouth the operator depends so much for his deception and the better this action is done the greater are the chances of ultimate success.



Details of the stump portion

The action is made by cutting away the lower half of the mouth and chin, re-setting them on a hinged block attached to a strong spring, which keeps the mouth shut until it is opened by a pull from a string from below. This is where the 'trap' effect sometimes occurs; it is caused by cutting out the mouth with straight horizontal lines. Whereas if the mouth can be cut with a slightly upward curve at either end, this trap-like appearance will be very much modified and give a much more natural and pleasant expression to the face.

Rounded lines to the cheeks, chin, and eyebrows will help to give a smiling, cheeky look to the features.

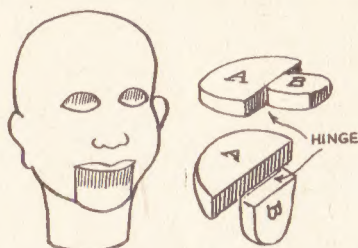
Mouth Parts

This mouth action will need very careful attention, although it is really fairly simple in construction. It consists of two wooden blocks (A) and (B). (A) is cut like a semi-circle to fit into the back half of the head—level with the mouth. (B) is the mouth block and its upper surface can be hollowed to represent the palate; teeth also may be added. (B) is attached to block (A) by means of a hinge on the underpart which allows it to fall away from (A). When this mouth-action is made the lower lip and chin piece which has been cut out of the papier mâché head may be glued neatly and firmly to (B).

Now the mouth movement is ready to be set in position in the head. Block (A) must first be fixed by means of glue or

nails; additional support for it may be given by fixing a small bracket block (C) just below the point of fixture.

The mouth is kept closed when the figure is not speaking by a special spring action. Another wooden block (D) is fitted very firmly to the top of the head, and connecting this block (D) with the mouth piece (B), is either a strong

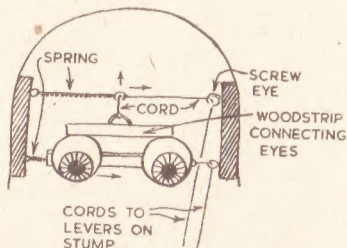


Mouth and eyes Mouth parts (1)

metal spring or a piece of stout elastic. On the underpart of (B) a cord is fixed with a ring attached to its end.

Thumb Operation

This cord passes out through the back of the neck a little way down the 'stump'—the wooden continuation of the neck—and the operator, with his thumb in the ring, pulls down the string to open the mouth. When the pull is released the spring from (D) and (B) pulls the jaw back into its normal position again. When the mouth action is set and finished to the showman's satisfaction, a piece of chamois leather is fixed neatly to the chin and to the neck to hide the cavity caused by the jaw movement.

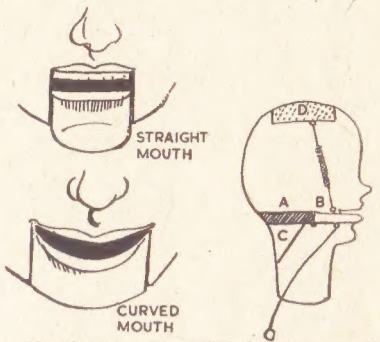


Details of eye movements

In some heads the mouth action is made by a movement of the lower lip only. The piece cut out with the lip does not take away the chin as well, this part remaining on the actual head. The mouth action is produced in the same

way as already described and the cavity between the lip and chin where the movement occurs is masked by carefully applied chamois leather as described above.

The eye movements are a much more



Mouth action (2) Mouth movement (3)

complicated matter than the opening of the mouth. They may be designed to move the eyes sideways, or up and down. The principle on which these actions are performed is the same as that used for the mouth movement. The eyes are pulled in a certain direction, horizontally or vertically by means of a cord or wire and are brought back into their normal position by means of counter-pulls in the form of springs. The controlling strings pass down the stump, through guiding screw-eyes and have rings or levers at their ends for the operator's fingers.

Large size 'sleeping' doll's eyes with 'balancing' fittings can be bought at doll shops. These could be used for an 'automatic', tilting, closing effect.

When the head and its movements are completed satisfactorily, ears may be modelled directly on to the sides with plastic wood, and wigs of hemp or crêpe hair affixed to complete the character.

The Stump

The stump is simply a wooden extension of the neck with a pointed or smoothly rounded end. It should be long enough to rest on a block of wood at the puppet's waist. Some 'vent' heads have the stump made of an ordinary broom-stick. This must be fixed securely into a circular disc of wood, about 1in. in thickness cut to fit the base of the papier mâché neck. On this stump are the cords which control the head action.

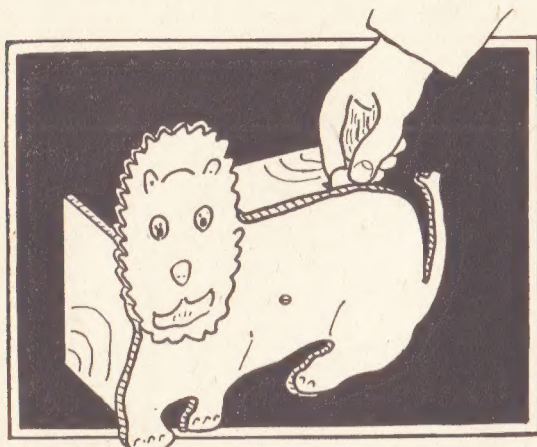
(To be Continued)

Do you make Model Galleons?

From time to time we have published in these pages pattern sheets for all the most popular ships of history—'Santa Maria', 'H.M.S. Bounty', 'Ark Royal', 'Cutty Sark', etc.—and kits were provided so attractive models could be made. Readers may be interested to know all these designs and kits are still available from any Hobbies Branch, or an illustrated leaflet of them can be obtained free on request to Hobbies Ltd., Dereham, Norfolk.



A simple mechanical novelty to make is this LAUGHING-LEO MONEY BOX



A YOUNGSTER who has this amusing little toy will learn the habit of thrift the easy way, because each time a coin is pressed into the slit Leo's fierce expression changes to a smile, and the child will want to 'do it again' for as long as the pennies last.

The construction is quite simple, and oddments of wood only are required. It will be seen that the cut-out lion is supported by two side pieces at right angles, and between these is fitted the box for holding the coins. Between the box and the front, however, is a moving piece, held to the front with a single bolt. It is on this piece that the two sets of features are painted, and they show through suitable slits made in the front cut-out.

When a coin is pushed in, it presses on to the movable piece for a moment before sliding into the box, which causes the piece to tilt up and bring the second face into position. The piece is so balanced that it falls back into its original place as soon as the coin drops into the box.

Cutting Out

Make a start with the front. Fig. 1 shows a suitable shape for the lion, and it is ruled in 1in. squares for easy copying. It will be seen that the main outline of eyes, nose and mouth are also cut out in this piece. Several other lines need to be painted in on the wood, to complete the effect. The inner edge of Leo's name, for instance, is better added by this means; and also the ears and whiskers on either side of the mouth.

Handymen with an artistic turn of mind will have their own way of doing this; but there is no need to worry about producing a perfect lion—the main thing is to make an amusing toy, and if the result is something of a caricature, so much the better.

The Moving Piece

Fig. 2 gives the dimensions for the

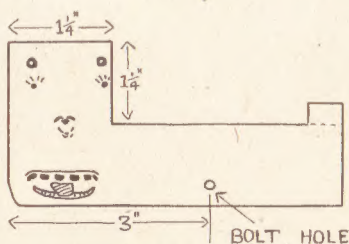


Fig. 2—The lifting feature portion and end view

moving piece. A hole is bored through in the position shown, to take the bolt, and near the top, on the inner side, is glued a small block, shaped as shown, to catch on the coin as it is pushed in through a slit in the lid of the box.

For this block, choose a soft piece of wood about 1in. long and 1/2in. by 1/2in., and glue or screw it into position. Then later, when the box is assembled, it can be tried with a coin in position, paring the wood down with a sharp knife at the top until the coin passes through, but not without it moving the piece as it goes by.

The rest of the case is shown at Fig. 3. Note that the inside upright is cut about 1/2in. shorter than the end two. This is to allow for the movable piece between front and box, and so it is a good plan to glue in this piece last, when the moving piece can be tried in position, and the exact width of this inside upright piece gauged accordingly.

The lid comes right to the front, over the top of the moving piece, except that at one end a piece is cut out for the coin to enter, and this comes immediately over the little coin block glued to the top of the moving piece.

The Expressions

Paint on to the moving piece the two expressions. One suggestion is given in the sketch; but readers who are handy with a paint brush can, of course, enlarge upon this as much as they like. The only thing to remember is that the laughing face must be below the fierce one, because the insertion of the coin tips the movable piece down at the back and up at the front.

It is a good plan to experiment with a few expressions on pieces of paper, trying them through the holes in the cut-out, before actually putting on the

final effect. Lay the cut-out front on to the paper and mark round the eyes, nose and mouth holes with a pencil. This gives a guide as to where the expression marks will fall, and some very amusing results can then be obtained.

It will be found that lines turning downwards at the ends tend to produce a savage look, and lines turning upwards a smile (or as near to smiling as can be

CUTTING LIST for wood of 1/2" thickness		
No.	Description	Size
1	Front	8" x 6"
2	Ends	3 1/2" x 3 1/2"
1	Centre Partition	2 1/2" x 3 1/2" (approx.)
1	Base	6" x 3 1/2"
1	Box Lid	3 1/2" x 3 1/2"
1	Box Back	3" x 2 1/4"
1	Movable Piece	5" x 2 1/2"

expected of a lion!). Similarly, large black eyeballs arranged to show just in the middle of the cut-out holes add to the fierceness, whilst smaller eyes, showing through at the bottom of the slits, with thin lines running upwards from them, will add a merry touch to the face. Teeth showing in the upper of the two expressions can be followed by a wide open mouth and tongue to add to the happier look.

It will be noted that the two sets of expressions are not exactly underneath each other, since the tilt of the moving piece is in the direction of an arc and consequently the lower must be painted

(Continued foot of page 90)

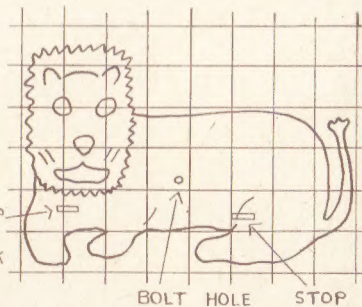


Fig. 1—Outline of figure with position points

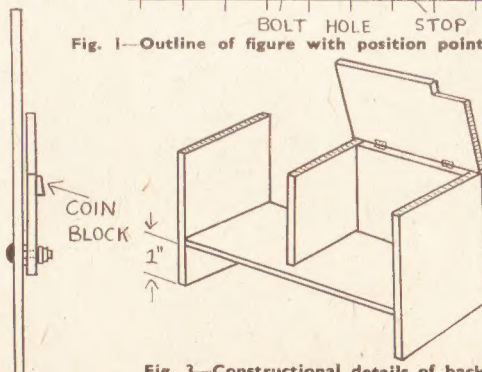


Fig. 3—Constructional details of back

Some wall board or wood can be turned into practical KITCHEN CONVENIENCES

If you intend to re-organise and rebuild some of the fittings in your kitchen it is a good plan to work it out now so you may be able to cut up some of the larger pieces of panel board in your shed and have them ready when you want to start. If you look carefully you will probably find a lot more space in which you can store trays, brushes and other items of equipment which would otherwise hang around in the way.

Sink Cupboard

First of all, if the sink is not enclosed you will find that a cupboard here can hold tins of polish, oils for small items and few spare brushes. Being enclosed as in Fig. 1 it may be a little damp, and holes should be drilled in the top of the doors for ventilation.

The average sink would be about 2ft. from the floor, according to its depth. It would be about 18ins. deep which gives you a very good cupboard space. As you are having cupboards at the sides the one framework will do for the front and could be assembled ready to fit in.

Note that the base is made with a board and a cut-out is allowed for the feet. To take the front right down to the floor is a mistake because it puts the person at the sink standing in a very uncomfortable position.

Upright Spaces

Between the copper and the sink you have another narrow space which is ideal for small hanging items. Make full use of this with the tall narrow cupboard (Fig. 2) which also gives you a handy additional shelf when washing up.

Bring this to the height of the sink or the copper, whichever you think best. Such things as the scrubbing board, spare trays, copper sticks and a short brush or broom will find a home in here.

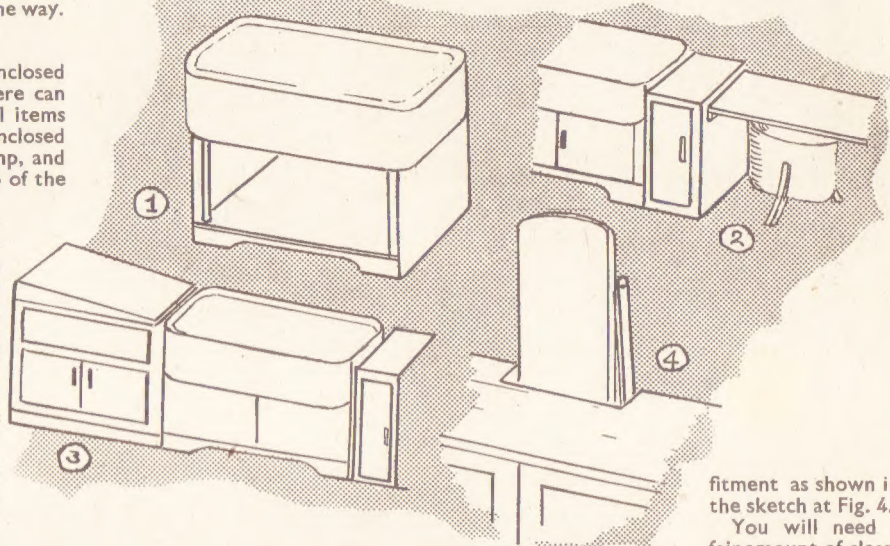
On the opposite side we have another cupboard which can be split (see Fig. 3). In the top we have the tea trays and other flat items. Below is a cupboard which can hold spare saucepans and tins, and you should arrange the shelves to suit the goods you intend to use it for.

As a special and more hygienic way the removable floor is a great asset. As

Work in the kitchen can be made easier by the correct placing of items, for preference under cover in cupboards.

Ironing Board Holder

One of those items which seems to never find a home is possibly the ironing board when folded up. In your re-planning you may have a cupboard at the back of which you can allow a slide-in



fitment as shown in the sketch at Fig. 4.

You will need a fair amount of clear-

ance room as the average ironing board measures at least 4ft. 6ins. when folded and therefore has to be drawn upwards to get it out. The width would be about 12ins. and a gap of 4ins.

In re-planning you may be able to allow for a let-down ironing board and if you do this consider the posture of the person using the iron and give the correct height from the 'pressure' point of view. Many shop-bought ironing boards are too high, and many kitchen sinks are too low.

(246)

Money Box—(Continued from page 89)

a fraction nearer the middle to be in the correct place when the piece is tilted upwards.

Assembly

When the expressions are right, fix the movable piece to the front by means of a short bolt. The nut on this bolt must be left loose enough for the piece to swing easily on it, and it is a good plan to lock the nut in the correct position by screwing on another one on top of it.

Now take a look at Leo's face and check just how much movement is required to change the expression from the top one to the lower. By this means the correct position for the two little blocks at the back, will be seen. The one nearest the head will support the

movable piece in its stationary position, and the other is placed to stop the movable piece when it has tipped back sufficiently, on the insertion of the coin.

Try pressing the piece down at the end, on to this stop (when the glue is hard), and if it does not fall back smoothly to its first position, weight it at the front with an oddment of lead or other heavy metal, screwed on the inner side.

The Coin Stop

Having prepared the front, with its movable piece, and the casing forming the back, we can now add the two together. Before they are finally fixed, however, the coin stop must be made to work efficiently. Hold the front on temporarily and then, with the lid of the

box shut, try a penny in the slot.

The coin stop will probably prevent it from going in, and now this piece should be carefully pared off, at an angle, a little at a time, until the coin will pass into the box by rubbing closely against it. This contact must be sufficient to tilt down the moving piece, as the coin goes by it. When this has been nicely adjusted, glue or screw the front on to the case and the construction is complete.

Finishing Off

Fix a little fastener on the inner side of the coin box, to engage in a keeper of the ringed-screw type put in the edge of the lid. The toy can then be finished off in gay colours, and if necessary a few finishing touches added to the face. (291)

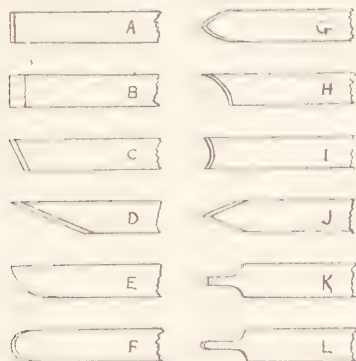
Some useful shapes and method for a set of CRAFTSMAN'S KNIVES

AN ordinary pocket knife is the favourite tool of the schoolboy, and it is, indeed, amazing the amount of useful work that can be accomplished with it. With a little practice and a certain amount of patience some very intricate carving and quite a lot of model making can be done with just a knife alone.

To the craftsman who does a lot of this kind of work the set of knives illustrated will be a real boon and the short time required to make them will be amply repaid very quickly.



The knives fitted to a simple handle



Various shapes for use

The tools are simple to make, besides which they need not cost you anything except the time taken. The steel blades are made from an old clock spring, and dowel rod is used for the handles.

Suitable Steel

The spring can be obtained from a watchmaker—he would most likely be glad to give you one, or if he does charge you a few coppers this should supply enough to make dozens of blades. Ask for a spring having a width of about $\frac{3}{16}$ in. or $\frac{1}{4}$ in. and the thickness should be round about $\frac{1}{32}$ in.

A spring which has been tempered to a pale straw is best for the job, although the actual hardness can vary considerably owing to the different grades of steel used in the manufacture.

Straightening

The spring will be coiled up somewhat and will require straightening and the best way of doing this is to hold it in a piece of rag, the thumb pressing on the convex side and the fingers on the other. With the other hand pull the spring through the rag, applying pressure with the thumb. By passing it through the hand a few times it should be sufficient to make it quite straight. If

any difficulty is experienced here the watchmaker would probably be able to do it for you.

Short Lengths

With a strong pair of pliers break off pieces about $2\frac{1}{2}$ ins. long which will be ample for the blades. One half of each piece should be heated in a spirit lamp or gas flame in order to draw the temper and make it soft enough to make the fixing holes.

You may soften the steel until it turns blue or you may even make it a dull red, but be very careful that you only do half the blade. By holding the other half in a pair of cold pliers you will prevent the heat from travelling along any further.

Fixing Holes

The two fixing holes can be either drilled or punched. If you drill them apply plenty of pressure and use a slow motion. The blades may be punched by placing over a piece of steel with a hole in it and giving a sharp hit with a hammer and punch. Or you can put the blade on a flat block of lead and punch in the same way.

File off any rough pieces and clean up

with a piece of fine grade emery cloth.

The blades can now be fixed into the handles of dowel rod, which should be the same size as the width of the blades. A handy length for the handles is $4\frac{1}{2}$ ins., but this may be varied to suit your particular requirements. Cut a slot to exactly fit the blade with a fine saw, drill the two holes and firmly rivet in position. The handles may be left in the natural state or they may be french polished.

Grinding

The knives can now be finished off by grinding the ends to the shapes required, and making the cutting edges to the correct angles, which will depend somewhat on the kind of materials to be cut. A and B shows a chisel edge with different cutting angles. All the knives may have the cutting angle on one side only, or some may be ground down on both sides of the blade.

If you are using an emery wheel and doing the grinding dry be careful not to overheat the thin steel blades or you may soften the metal and spoil the cutting edge. It is best to do the grinding on a grindstone, using plenty of water. (272)

A New Book for Ship Modellers

The Ship Modeller's Workshop

By R. K. Battson

Percival Marshall & Co. 3/6

THE choice of subject open to the ship modeller is so great that there is always room for another good book on this fascinating subject.

In this new work the author has made a praiseworthy effort to provide the ship model makers with what may be termed a manual of workshop practice.

There are many good items, the method of making gratings on page 29, and the way to 'joggle' the deck planks, pages 54-56, to mention only two; this last is, more often than not, overlooked by the ship modellers through lack of knowledge of ship-building practice. It is, of course, not practical on very small scale models, but a worthwhile improvement on models made to $\frac{1}{4}$ in. scale and upwards.

Ship fittings of various kinds and periods are taken in alphabetical order and the methods given for making each part have the merit of being both practical and simple.

Chapters on materials, carving and the making of hulls will be of invaluable

help, while the section on painting will help towards attaining that finish that means so much to the appearance of the completed model.

It would have improved the reference to davits had the author included, for the sake of the beginner, a suggestion for a jig to enable the model maker to turn out davits with exactly the same curvature.

Two omissions have surprised, no reference is made to ventilators, nor is any suggestion given for the making of rails and rail stanchions, both items are often troublesome and appear out of scale on many amateur models, and often badly shaped.

It would be impossible in a work of this size to include samples of all ships fittings, in fact several volumes would be necessary for the purpose, but sufficient is given to make this little work one that should be on every ship modeller's workbench, a constant guide, always at hand to help with that ticklish problem.

'Whipstaff'

A PHOTOGRAPHIC ALPHABET

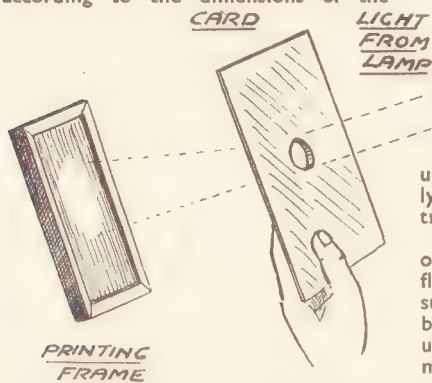
V and W

V stands for—

Vignetting

YOU will all have seen that type of photograph where the picture, often a head and shoulders, fades away on all sides to plain white paper. These pictures have been vignetted, and like many of the best effects in photography the method used to get the shading is almost laughably simple.

A card of a size bigger than your printing frame is cut, and out of the centre of this is taken a circular hole of anything from a $\frac{1}{8}$ in. to 1 in. diameter—according to the dimensions of the



print. Experiment with an empty frame first. Set this up at the usual distance you do your printing from the light and hold the card in front as shown. A circle of light will fall on the frame, but with soft, diffused edges. The size of hole can be altered by moving the card nearer to or further from the frame.

Well, that is how it is done. Put in your negative and paper and spot the head and shoulders or whatever it is with light through the hole, and make the print thus.

It is good to diffuse the edges more still by moving the card alternately nearer and further from the frame, though a small distance, during the exposure, keeping the required image central, of course.

W stands for—

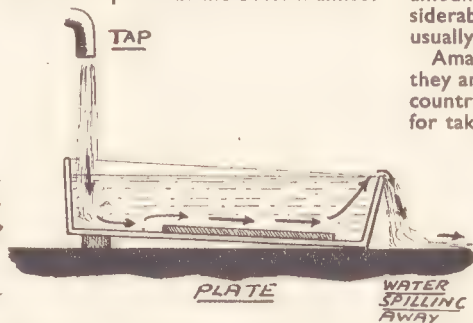
Washing

AFTER 'fixing' plates, films, gaslight paper and bromide paper must be washed, and you will find that great importance is always placed on the thoroughness of this. Perfect washing is also needed after (or during) other photographic processes such as intensification.

Care has to be taken to make washing really effective, the main point being

that the water must flow sideways over the prints or plates and then drain off readily. This because the washing water is actually carrying away unwanted residues.

Thus washing in a too deep container is no good, as water can enter in top layer, as it were, and flow away, leaving the films or prints at the bottom almost



unaffected. Similarly, a batch of prints lying one on the other are not being truly washed.

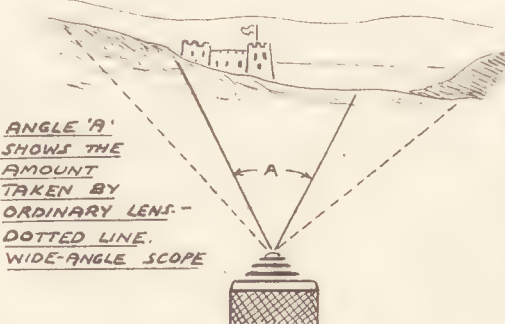
Good washing arrangements are always of the cascade type with the water flowing in one way or another across the surfaces, but much can be done by the beginner to help the washing in ordinary utensils. Never attempt to wash too much material together.

If it is prints that are being dealt with, keep them on the move so they are floating up and down in the water. Let the tap run into one end of a dish and see to it by slightly tilting, that it is spilling out at the opposite side, not falling back over the same edge.

The aim of much washing is to remove every trace of hypo which if left in a print or film will shortly cause brown stains. Washing must be particularly good if any after-treatment is to be tried, hypo being fatal to good intensification, reduction, sepia toning, etc.

Wide-angle Lenses

THIS is a term often seen used in the description of a second-hand camera.



Imagine two invisible lines going from the lens of a camera to the extreme left and right objects that will appear on the film. These lines will form an angle at the optic which is sometimes called the 'angle of view'. The bigger the angle more of the scene will be taken in.

A wide-angle lens takes in no particular amount of a scene but embraces considerably more than the type of lens usually fitted to the camera in question.

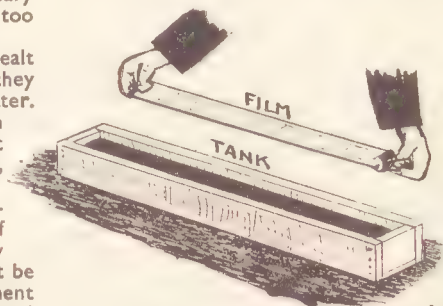
Amateurs find 'W A' lens useful if they are keen on taking broad sweeps of country. Professionals use them mainly for taking interiors where both sides of a wide hall have to be included in the one print.

Water Bathing

THIS is a novel way of developing films or plates which any amateur can try. It has the effect of bringing out every bit of detail all over

the surface, especially in the shadow—so it is a very good method for known under-exposure.

The system is simply this—the film or plate is placed in developer for about 30 seconds and placed carefully in plain water for a moment, then put back in



the developer for about 1 minute, and then in the water for a correspondingly longer time. This alternate developer and water continuing, the times increasing, till development is complete.

With plates, working the system is simple as it only requires a second dish, filled with plain water. With films, it is rather more difficult as they roll up. The best way, therefore, is to put a 'bull-dog' clip on either end and work beside a bath with a little water in the bottom in which the film can be quietly laid, face-up, the clips preventing any tendency to roll. Woodworkers might think it worth while to make the simple wooden tank shown.

(To be Concluded)

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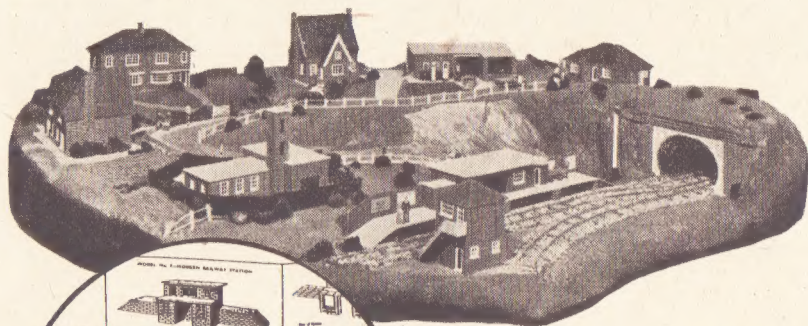
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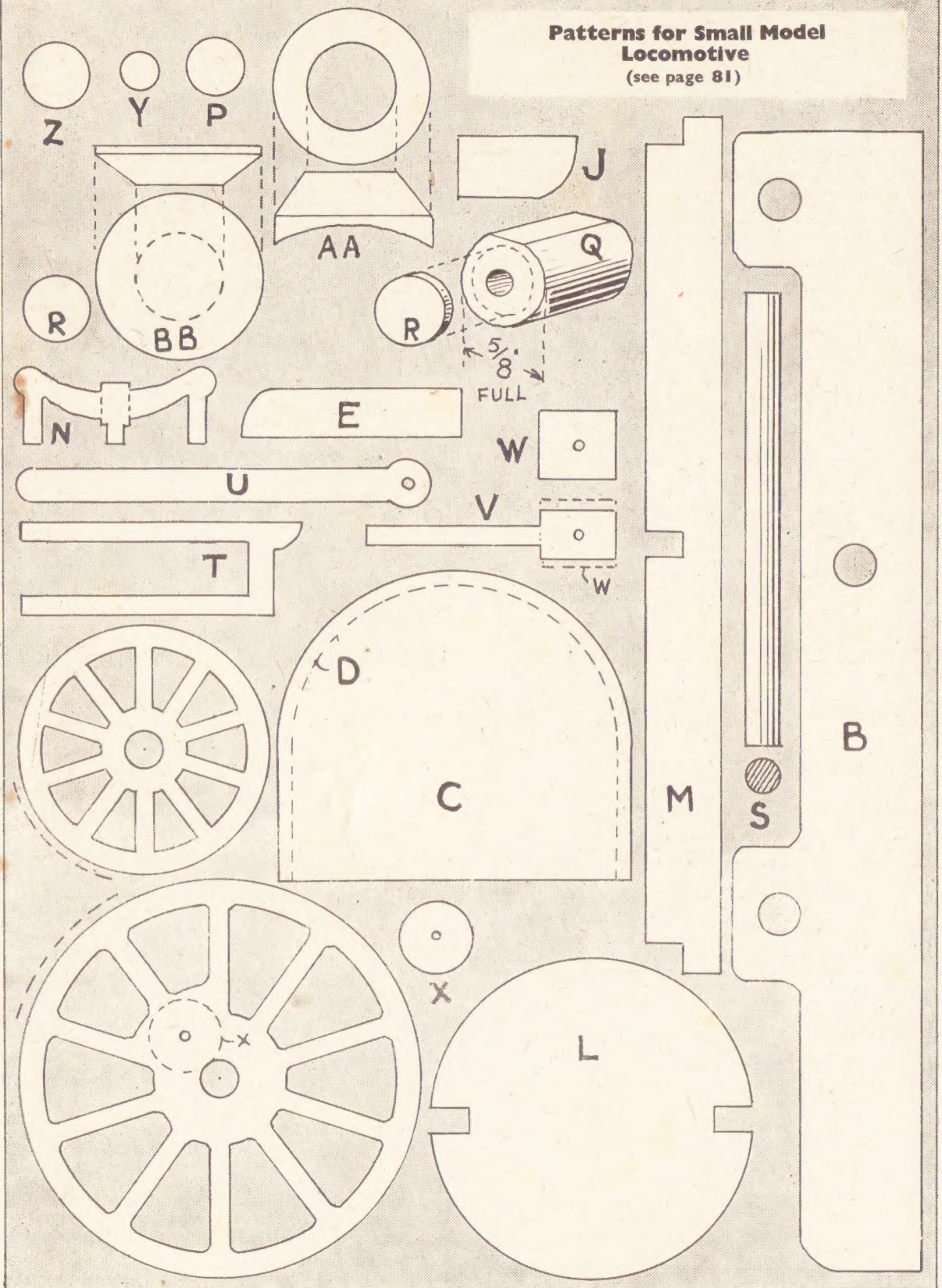
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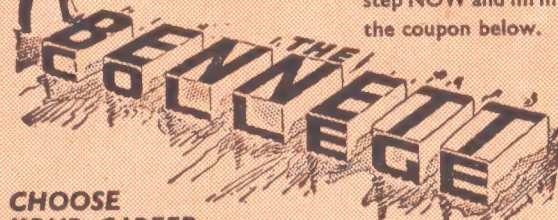
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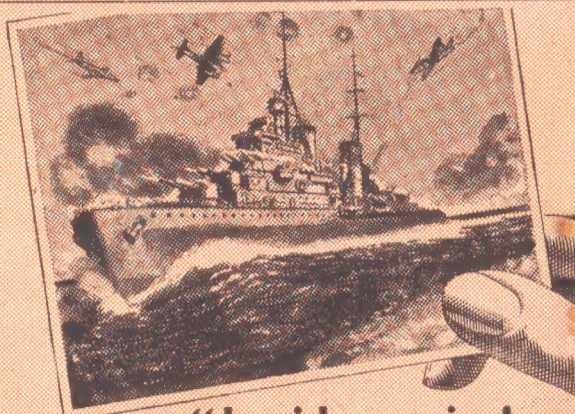
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